

18. How are successor and precursor complexes formed? Explain briefly with suitable examples.
19. Describe the substitution reactions of square-planar complexes with suitable examples.
20. Explain the photo-sensitisation reactions of $[\text{Ru}(\text{bpy})_3]^{2+}$ complex and give its application in solar energy conversion.

APRIL/MAY 2023

DCH32 — INORGANIC CHEMISTRY — III

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How the terminal and bridging carbonyl groups are identified using IR stretching frequencies?
2. State effective atomic number (EAN) rule.
3. Give an example of Reppe's catalyzed reaction.
4. Write the ziegler natta catalyst preparation reaction.
5. What is a successor complex? Give example.
6. What are bridging ligands in coordination complexes? Give an example.
7. Define "Trans effect" with a suitable example.

8. How do ligands affect the structure of metal complexes?
9. What are solvolytic reactions?
10. Give two representative reactions for Photoredox reactions.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Outline the structure and bonding characteristics of metal nitrosyls.

Or

- (b) Write note on ligand protonation in organometallic compounds.

12. (a) Investigate the mechanism of Ziegler–Natta catalyst in stereoregular polymerization process.

Or

- (b) Explain in detail about polymer bound catalyst.

13. (a) Explain briefly the mechanisms of inner sphere and outersphere complexes.

Or

- (b) Discuss about the complementary and non-complementary reactions.

14. (a) How is trans-effect employed for distinguishing between cis and trans isomers of $[\text{Pt A}_2 \text{X}_2]$ type complexes?

Or

- (b) Explain the influences of entering and leaving groups in substitution reaction.

15. (a) Discuss the photo isomerisation process in metal complexes.

Or

- (b) Write a note on photoredox reactions of coordination complexes with examples.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Describe the synthesis, structure and bonding of ferrocene.

17. Give an account on:

- (a) Hydroformylation of olefins (Oxo Process) (5)

- (b) Wilkinson's Catalyst (5)